Master theses on the analysis of routine data from outpatient medical care

Timely secondary data analysis is still a rarity in Germany. The Institute for Family Medicine has developed an infrastructure for the daily analysis of anonymized patient data from several primary care practices.

The data can be extracted directly from the electronic health records (EHRs) of the participating practices. To date, there is no comparable infrastructure for the analysis of ambulatory care data in Germany. The number of participating practices will be increased in the coming months.

The Institute of Family Medicine (University Lübeck) offers master's theses on the analysis of routine data from outpatient medical care on the following topics.

Polypharmacy & Multimorbidity

Demographic change is leading to an increase in the number of patients suffering from two or more long-term conditions (multimorbidity) and often taking multiple medications (polypharmacy). Caring for these patients is a particular challenge in primary care because of the interactions between medications and diseases. Estimating the care needs of polypharmacy and multimorbidity patients in Germany usually requires costly and complex studies. Within the scope of this master thesis, the most frequent combinations of multimorbidity will be identified on the basis of routine data from outpatient medical care. Furthermore, a score will be developed that predicts the risk of mortality.

Literature:

- Hassaine, A., Salimi-Khorshidi, G., Canoy, D., & Rahimi, K. (2020). Untangling the complexity of multimorbidity with machine learning. *Mechanisms of Ageing and Development*, 190, 111325.

- Soley-Bori, M., Bisquera, A., Ashworth, M., Wang, Y., Durbaba, S., Dodhia, H., & Fox-Rushby, J. (2022). Identifying multimorbidity clusters with the highest primary care use: 15 years of evidence from a multi-ethnic metropolitan population. *British Journal of General Practice*, 72(716), e190-e198.

- Stawicki, S. P., Kalra, S., Jones, C., Justiniano, C. F., Papadimos, T. J., Galwankar, S. C. & Evans, D. C. (2015). Comorbidity polypharmacy score and its clinical utility: A pragmatic practitioner's perspective. *Journal of Emergencies, Trauma, and Shock*, 8(4), 224.

Risk factors for adverse drug reactions

Prescribing drugs is by far the most common medical intervention. In addition to positive effects, drugs also cause adverse drug reactions. Demographic change is leading to an increase in the number of patients suffering from two or more long-term illnesses at the same time (multimorbidity), often accompanied by the use of several medications (polypharmacy). Multimedication and adverse drug reactions entail the risk of so-called prescription cascades. These cascades occur when a prescribed drug causes an adverse drug reaction, for the treatment of which a subsequent drug is prescribed. The influence of prescription cascades on the quality of outpatient care in Germany and the risk factors involved have not yet been systematically investigated. In this master thesis, signals and risk factors of possible prescription cascades are to be identified by means of so-called "Prescription Symmetry Sequence" analyses (PSSA) based of routine data from outpatient medical care.

Literatur:

- Dreischulte, T., Shahid, F., Muth, C., Schmiedl, S., & Haefeli, W. E. (2022). Prescribing Cascades: How to Detect Them, Prevent Them, and Use Them Appropriately. *Deutsches Ärzteblatt International*, 119(44).

- Morris, E. J., Hollmann, J., Hofer, A. K., Bhagwandass, H., Oueini, R., Adkins, L. E., ... & Vouri, S. M. (2022). Evaluating the use of prescription sequence symmetry analysis as a pharmacovigilance tool: A scoping review. *Research in Social and Administrative Pharmacy*, 18(7), 3079-3093.

Development of quality indicators for primary care

A crucial prerequisite for an efficient healthcare system is quality assurance that includes the development of different approaches and measures to ensure defined quality requirements. For inpatient care, the use of routine data for quality assurance (QSR procedures) has become firmly established. Quality indicators have also been developed for outpatient care. The aim of this thesis is to examine the extent to which (established) quality indicators can be mapped using routine data from primary care. Based on these indicators, the quality of care provided by outpatient care providers and possible risk factors for patients with various diseases will be investigated.

Literature:

- Beyer, M., Chenot, R., Erler, A., & Gerlach, F. M. (2011). Die Darstellung der hausärztlichen Versorgungsqualität durch Qualitätsindikatoren. *Zeitschrift für Evidenz, Fortbildung und Qualität im Gesundheitswesen*, 105(1), 13-20.

- Semlitsch, T., Abuzahra, M., Stigler, F., Jeitler, K., Posch, N., & Siebenhofer, A. (2019). Qualitätsindikatoren für Primary-Health-Care-Einrichtungen in Österreich. *Das Gesundheitswesen*, 81(07), 527-538.

Impact of weather (especially heat) on events in primary care

Extreme heat and prolonged hot spells are important risk factors for health. Numerous studies show that high temperatures lead to an increased burden on the health care system and can also demonstrate a systematic link between heat events and increased mortality events. This master thesis will examine the impact of weather (particularly heat) on events in outpatient care (e.g., practice visits, occurrence of certain disease events such as strokes, etc.). For this purpose, weather data from practice locations will be matched to routine data from outpatient medical care.

Literature:
- Winklmayr, C., Muthers, S., Niemann, H., Mücke, H. G., & an der Heiden, M. (2022). Hitzebedingte Mortalität in Deutschland zwischen 1992 und 2021. *Dtsch Arztebl Int*, 119, 451-457.

Effect of consultation duration on future utilization

Many patients would like to have a more detailed consultation with their doctor. However, longer consultation times do not automatically lead to higher patient satisfaction. Depending on the reason for the consultation, there might be differences in the desired length of the consultation between patients. The aim of this thesis is to investigate whether the duration of the consultation has an effect on the selection of patients. For instance, it can be assumed that patients who are in a hurry (without complex diseases) are more likely to consult a doctor whose treatments are characterized by shorter consultations. Conversely, patients with complex diseases (e.g., chronic and mental illnesses) might be more likely to choose physicians with longer consultations. In addition, this master thesis will examine the extent to which longer consultations can lead to less frequent visits by patients to the practice.

Literature:
- Wilson, A., & Childs, S. (2002). The relationship between consultation length, process and outcomes in general practice: a systematic review. *British Journal of General Practice*, *52*(485), 1012-1020.

- Wilson, A. D., & Childs, S. (2006). Effects of interventions aimed at changing the length of primary care physicians' consultation. *Cochrane Database of Systematic Reviews*, (1).

- Klement, A., Oemler, M., Wienke, A., Richter, M., & Wolfradt, U. (2015). (Erwartete) Konsultationsdauer, psychische (Ko-) Morbidität und Zufriedenheit mit dem ärztlichen Gespräch in der Hausarztpraxis. *Zeitschrift für Evidenz, Fortbildung und Qualität im Gesundheitswesen*, 109(8), 560-569.

- Stunder, W., Scherer, M., & Himmel, W. (2008). Wie gut schätzen Hausarzt-Patienten den Zeitbedarf einer Konsultation ein? *DMW-Deutsche Medizinische Wochenschrift*, 133(03), 67-70.

- Gopfert, A., Deeny, S. R., Fisher, R., & Stafford, M. (2021). Primary care consultation length by deprivation and multimorbidity in England: an observational study using electronic patient records. *British Journal of General Practice*, *71*(704), e185-e192.